EXHIBIT #12: Inventory Listing of Argentine Levee Pump Stations and Outlets/Drainage Structures

Argentine Levee Unit STORM SEWERS AND OUTFALLS						
Description	Location		Structure Information			Comments
	Levee Station (ft)	Offset to Outlet (ft)	Conduit Size	Conduit Composition	Control Structure Type LW = landward RW = riverward	
Conduit just west of 55th Street: This drains a relatively small amount of flow that accumulates near the toe of the levee at the inlet.	13+75	50	12"	CMP	Flap gate (RW)	A. The conduit drains a small area along the toe of the levee, as shown by the operational drawings of the latest O&M manual. B. This drainage structure was not analyzed in the overall hydrologic analysis within the "Supplement on Interior Drainage". C. The conditions of the area draining to this structure have not changed significantly since the conduit's design.
Turner Ditch Outlet: The flow is transported by Turner Ditch which parallels Thorne Road and services this area.	35+10 (16+50[1])	130	36"	RCP	Flap Gate (RW) Sluice Gate (LW)	A. The upstream ditch controls the flow to be discharged through the 36" RCP. B. The capacity of the drainage system described in the 1950 "Supplement on Interior Drainage" was based upon an area of 24 acres and a time of concentration of 64 minutes. Since then the area has been increased to 50 acres due to the expansion of the Lock Joint Company. This, in turn, increased the percent impervious. C. The original outlet (10' x 3' RCB with 4' x 3' bulk head) has been abandoned. It was replaced by a 36" RCP in 1958.
Turner Industrial Sewer (Turner Pump Station Outlet)	60+40 (42+41[1])	124	2 - 5'W X 8'H	RCB	Leaf Gate (RW) Sluice Gate (LW)	A. This is the outlet structure for Turner Pump Station. B. The time of concentration was based upon the area serviced by the sewer system (a 434 acre tract). C. The sewer system was designed based upon the assumption that only 434 acres would be developed. Therefore, if more development occurs within the total 625 acres area, then the sewer may not have capacity. D. The system was designed so that at no point in the system the HGL would be higher the 3 ft below the ground level. E. The entire 625 acres is now developed. The Bulk Mail Center and ConAgra pump plants have been built in this area and service a portion of the original 625 acres. The 625 acres contributing to the Turner pump plant has been reduced to approximately 574 acres. This alleviated any burden that the extra impervious area would have caused. This area is now developed with the construciton of Bulk Mail Center and the ConAgra. The maximum seepage flow rate of 13.4 cfs at stage 40.8 no longer applies because the pumps located on each of the developed areas now assume a portion of this flow. Maximum ponding of 125 acre-ft no longer applies because the ponding is n
Thompson-Hayward Chemical Company: The conduit services miscellaneous drainage from the industry.	97+70	55	8"	CIP	Gate Valve (RW)	A. This drainage structure was not analyzed in the overall hydrology within the "Supplement on Interior Drainage". B. This conduit is not believed to be a storm drainage structure. A pipe profile was found which shows that the flow type must be pressure; because of the flow type and size it is believed to be a force water main. C. As the contributing flow is assumed to be industrial flow, the adequacy of the conduit is not affected by storm events. However, conditions have not significantly changed in the area.

Note: Unless shown otherwise, stages given refer to the Kansas City gage on the Hannibal Bridge at Missouri River mile 366.1 using the original datum of 715.79. This original datum was in use from February, 1948 to October, 1989, when the current datum of 706.4 went into effect. Elevations in the table correspond to the river at the pipe location.

EXHIBIT #12: Inventory Listing of Argentine Levee Pump Stations and Outlets/Drainage Structures

Argentine Levee Unit STORM SEWERS AND OUTFALLS						
Description	Location		Structure Information			Comments
	Levee Station (ft)	Offset to Outlet (ft)	Conduit Size	Conduit Composition	Control Structure Type LW = landward RW = riverward	
Thompson-Hayward Chemical Company: The conduit services miscellaneous drainage from the industry.	104+85	55	4"	CIP	Gate Valve (RW)	A. This pipe was not analyzed to drain any large drainage areas. B. It appears that this pipe drains a small pond located on the Thompson-Hayward Chemical Company property. The exact function of the pond is not known. C. As the contributing flow is assumed to be industrial flow, the adequacy of the conduit is not affected by storm events. However, conditions have not significantly changed in the area.
Bulk Mail Center	131+33	***	20"	SP	Flap Gate (RW)	A. This pipe is one of the two force main pipes that carry water pumped by the Bulk Mail Center Pump Plant to the gatewell structure. These pipes cross the levee because the gatewell structure is on the riverside of the levee. B. As alluded to in the table, this conduit is only dependent upon the Bulk Mail Center Pump Plant operation.
Bulk Mail Center	131+37	***	36"	SP	Flap Gate (RW)	A. This pipe is one of the two force main pipes that carry water pumped by the Bulk Mail Center Pump Plant to the gatewell structure. These pipes cross the levee because the gatewell structure is on the riverside of the levee. B. As alluded to in the table, this conduit is only dependent upon the Bulk Mail Center Pump Plant operation.
Bulk Mail Center	131+50	***	48"	CIP	Sluice Gate (RW)	A. This drainage structure was not analyzed in the overall hydrologic analysis researched by the team. B. The seepage flow is contributed from the area between approximately station 120+00 to station 140+00. C. This conduit is the gravity outlet structure for Bulk Mail Center Pump Station. D. The Bulk Mail Center was constructed in an area that was originally used to store seepage flow during high river stages. A portion of the flows described in the 1950 "Supplement on Interior Drainage", paragraph 13 is now pumped through this outfall by in-house pumps located on this property. Consequently, the pumps have relieved the load on the Turner Pump Station. E. The Bulk Mail Center has been built in an area which was originally used for storage of seepage flow. This storage area has now been filled in. The percent impervious was estimated from visual inspection of 1996 aerial photography.

Note: Unless shown otherwise, stages given refer to the Kansas City gage on the Hannibal Bridge at Missouri River mile 366.1 using the original datum of 715.79. This original datum was in use from February, 1948 to October, 1989, when the current datum of 706.4 went into effect. Elevations in the table correspond to the river at the pipe location.

EXHIBIT #12: Inventory Listing of Argentine Levee Pump Stations and Outlets/Drainage Structures

Argentine Levee Unit STORM SEWERS AND OUTFALLS						
Description	Location		Structure Information			Comments
	Levee Station (ft)	Offset to Outlet (ft)	Conduit Size	Conduit Composition	Control Structure Type LW = landward RW = riverward	
ConAgra outlet (possible seepage outlet)	145+00 (127+00[1])	45	36"	RCP	Flap Gate (RW) Sluice Gate (RW)	A. This drainage structure was not analyzed in the overall hydrologic analysis researched by the team. B. The seepage flow is contributed from the area between station 140+00 to station 165+65. C. This conduit is the gravity outlet structure for ConAgra Pump Station. D. The Swift Packing Company (now ConAgra) was constructed in an area that was originally used to store seepage flow during high river stages. A portion of the flows described in the 1950 "Supplement on Interior Drainage", paragraph 13 is now pumped through this outfall by in-house pumps located on this property. Consequently, the pumps have relieved the load on the Turner Pump Station. E. The Swift Packing Company (now ConAgra) has been built in an area which was originally used for storage of seepage flow. This storage area has now been filled in. The percent impervious was estimated from visual inspection of 1996 aerial photography.
Detention Pond outlet	190+00	***	60"	RCP	Flap Gate (RW) Sluice Gate (RW)	A. It appears to be the outlet structure of a detention pond adjacent to it. The detention pond was located during the site visits. The exact purpose of the detention pond is unknown. B. This drainage structure was not analyzed in the overall hydrologic analyses researched by the team. C. The 16" CIP at station 210+73 was described in the 1950 "Supplement on Interior Drainage" to discharge seepage that ponds in this area. It is believed that this 60" RCP now performs the seepage discharge function. Seepage is contributed from the area between station 165+65 (156+001) and station 212+50 (200+001) D. The condition at the Design Flood Stage is shown. The gate will be closed and the flow though the pipe will be zero. The pipe will discharge only when the river is low enough. The purpose of this pipe will simply be to speed up the removal of seepage water. The ponded seepage water will now have a direct outlet to the river as opposed to the slower process of being removed by infiltration and evaporation. E. The percent impervious was estimated by visual inspection of 1996 aerial photography and it does not appear that the conditions in the area of the pond have changed significantly over time.
Ramp Drainage	218+17		36"	RCP	Flap Gate (RW) Sluice Gate (LW)	A. This drainage structure was not analyzed in the overall hydrology. B. Drains the small area enclosed by an on-ramp to Kansas Ave. C. There are seepage flow ponds in the area adjacent to the levee (contributed from area between station 212+50 and station 253+14). Only the condition at the Design Flood stage is shown. The gate will be closed and the flow though the pipe will be zero. The pipe will discharge only when the river is low enough. The purpose of this pipe will simply be to speed up the removal of seepage water. The po seepage water will now have a direct outlet to the river as opposed to the slower process of being removed by infiltration and evaporation. D. The percent impervious was estimated by visual inspection of 1996 aerial photography and it does not appear that the conditions in the area of the ponds has changed significantly over time.

Note: Unless shown otherwise, stages given refer to the Kansas City gage on the Hannibal Bridge at Missouri River mile 366.1 using the original datum of 715.79. This original datum was in use from February, 1948 to October, 1989, when the current datum of 706.4 went into effect. Elevations in the table correspond to the river at the pipe location.

EXHIBIT #12: Inventory Listing of Argentine Levee Pump Stations and Outlets/Drainage Structures

Argentine Levee Unit STORM SEWERS AND OUTFALLS						
Description	Location		Structure Information			Comments
	Levee Station (ft)	Offset to Outlet (ft)	Conduit Size	Conduit Composition	Control Structure Type LW = landward RW = riverward	
Sinclair Oil Company Outlet	247+32 (229+32[1])	109	24"	CIP	Flap Gate (RW) Sluice Gate (RW)	A. The conduit picks up Sinclair Oil Company area drainage (See 1962 "Design Memorandum No.2" refer to the Plate 33) B. This pipe drains the water that ponds on the Sinclair Oil Company property. The percent impervious was estimated by visual inspection of 1996 aerial photography and represent a similar condition to the design of the conduit.
Santa Fe Ditch System Outlet (Argentine Main station outlet)	253+14	40	9.0'W X 9.5'H	RCB	Sluice Gate (LW)	A. This is an outlet structure for the Argentine Pump Station (Kaw Valley East Pump). B. The conduit services the runoff from the railyards and the uplands. Runoff is collected by the Santa Fe Ditch system and ponds at the inlet of the 9.0' x 9.5' RCB. C. The drainage area is reduced by 134 acres due to the Ruby Street Sewer. D. Two new pumps were added to the Argentine Pump Station in recent years. They are located just outside the pump house. While specific information could not be obtained in a reasonable amount of time, a greater capacity is now available for pumping needs. This means that more flow could potentially be pumped through the outlet conduit.
Santa Fe Yard Sewer (Argentine Main Outlet)	258+36 (246+17[1])	93	4.0'H X 5.5'W	RCB	Leaf Gate (RW) Sluice Gate (LW)	A. This is the outlet structure for the Santa Fe Yards Pump Station. B. The conduit services the eastern tip of the railyards. C. The outfall conduit no longer discharges to the river. D. The pump plant pumps all drainage to a holding tank so that ponded water can be treated and discharged into the City's sanitary sewer system. E. The pump plant is not designed to drain the overflow from the Strong Avenue Sewer, but it is forced to during high intensity rainfalls v the Strong Avenue Sewer overflows. There are ponding problems which appear to be related to the pump capacities, but could potentially be related to the outlet conduit.
Strong Avenue Sewer (Strong Ave Pump Station Outlet)	273+41 (263+21[1])	109	7.0'W X 7.0'H	RCB	Flap Gate (RW) Sluice Gate (LW)	A. This is the outlet structure for the Strong Avenue Pump Station. B. The Ruby Street Sewer System was built to intercept much of the storm runoff from the Strong Avenue Sewer and the Strong Avenue Sewer was made to intercept sanitary flow from the 16th Street Sewer and other sewers in the area, making it primarily a sanitary sewer. C. A low flow weir has been installed and the low flows are forced across the river and eventually to the treatment plant. D. The area was reduced from 517 acres to 175 acres (considered current design) when the Ruby Street Sewer System was built. The reduction of the drainage area decreased the severity of the surcharge problems of the Strong Avenue Sewer. However, the capacity of the pumps in the pump station is what controlled the flow received by the outlet conduits. The pump capacity was increased in recent years, putting more flow through the boxes.

Note: Unless shown otherwise, stages given refer to the Kansas City gage on the Hannibal Bridge at Missouri River mile 366.1 using the original datum of 715.79. This original datum was in use from February, 1948 to October, 1989, when the current datum of 706.4 went into effect. Elevations in the table correspond to the river at the pipe location.

EXHIBIT #12: Inventory Listing of Argentine Levee Pump Stations and Outlets/Drainage Structures

Argentine Levee Unit STORM SEWERS AND OUTFALLS						
Description	Location		Structure Information			Comments
	Levee Station (ft)	Offset to Outlet (ft)	Conduit Size	Conduit Composition	Control Structure Type LW = landward RW = riverward	
16th Street Sewer	280+48 (270+41[1])	83	36"	RCP	Flap Gate (RW) Sluice Gate (RW)	A. This outfall drains a residential area south of the tracks. The area served is above the design flood stage and is not subject to flood damage. B. There are two manholes in this system which are 0.8 ft below the design flood elevation. They need to be sandbagged at stage 31.2 feet. C. Ponding is a maximum at 14.0 ft. flood stage. D. The estimated percent impervious from visual inspection of 1996 aerial photography reflects the fact that the area has not changed significantly since original design of the outlet conduit.
Ruby Street Sewer System outlet	284+35 (274+25[1])	***	10'W X 10'H	RCB	Sluice Gate (Lw)	A. The Ruby Street Sewer was built by local interests in 1958 to handle the coincident 30-year event with a river stage of 14.0 feet. B. The area served is above the design flood stage and is not subject to flood damage. C. The system is designed to be a pressurized gravity flow pipe. D. Gates are seldom closed due to the steep HGL slope. A high river stage should not back flow out of the inlets. E. The purpose of this storm sewer system was to eliminate the surcharging of the Strong Avenue Sewer system and also to separate the storm flow from the sanitary. F. The percent impervious was estimated from visual inspection of 1996 aerial photography and reflects no significant change from the time of original conduit design.
Eastern End Conduit	288+10	***	6"	***	Gate valve (LW)	A. This drainage structure was not analyzed in the overall hydrologic analyses researched by the team. B. This structure appears to drain a small area near the toe of the floodwall, as shown by the operational drawing of the latest O&M ma However, it could possibly just be a cable sleeve that passes through the levee. C. As the drainage district personnel are not aware of the purpose of this conduit, it is probably insignificant. However, personnel are not aware of any changes to the land in the vicinity of the conduit.

Note: Unless shown otherwise, stages given refer to the Kansas City gage on the Hannibal Bridge at Missouri River mile 366.1 using the original datum of 715.79. This original datum was in use from February, 1948 to October, 1989, when the current datum of 706.4 went into effect. Elevations in the table correspond to the river at the pipe location.